

In a negative resist, the exposure to the activating means, such as UV light causes the negative resist to become polymerized, strengthened and essentially insoluble in the developer solution. Thus, the negative resist remains on the surface wherever it is exposed. The system is analogous to a photographic negative which contains substantially transparent and substantially opaque areas. In this negative system, the areas under the transparent areas are polymerized and the areas under the opaque areas are not and wash away with the application of the developer solution. The negative image of the image of the mask is transferred to the resist. The present invention utilizes the "negative" resist.

The negative line level and negative via level pattern in the mold generate a negative of the dual damascene structure. Thus the imprinted relief equates to the dual damascene structure.

In Figure 4a, a mold substrate, 4-100, is coated with a resist material, 4-110. This resist material is patterned with a negative via-level pattern resulting in the topography 4-120 depicted in Figure 4(b). This pattern is then etched into the substrate leaving a negative via-level topography transferred into the substrate as shown in Figure 4b. A planarizing layer, 4-130, is used to coat over the substrate. A resist, 4-140, is then coated over this layer and patterned with a negative line-level pattern, 4-150, as shown in Figure 4c. This negative line pattern is then used to etch into the substrate to generate a negative line pattern, 4-160, in the mold substrate as in Figure 4d. The layers are then removed to leave the desired negative dual damascene relief topography, 4-190R. This topography is then used as a mold, 4-240, shown in Figure 4f. As indicated in Figure 4f, this can then be used as a mold, 4-240, in the imprint patterning steps for the patterning steps in forming the articles depicted in Figure 2 (2-240) and Figure 3 (3-240). It should be noted that the order of the patterning can be either via-first or line-first.

A second embodiment of the mold fabrication process of the present invention utilizes a trilayered hardmask scheme. The particular number of hardmask in this scheme is representative and does not limit the approach to three layers.